



Volunteer Lake Assessment Program Individual Lake Reports

OTTER POND, SUNAPEE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	11,098	Max. Depth (m):	9.6	Flushing Rate (yr ⁻¹)	8.1
Surface Area (Ac.):	185	Mean Depth (m):	3.8	P Retention Coef:	0.43
Shore Length (m):	4,800	Volume (m ³):	2,820,500	Elevation (ft):	1125

TROPHIC CLASSIFICATION

Year	Trophic class
2005	MESOTROPHIC
2008	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	Chlorophyll-a	Good	>=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

OTTER POND - MORGAN BEACH	E. coli	Bad	>=1 exceedance(s) of geometric mean criterion and/or >=2 exceedances of single sample criterion, with 1 or more >2X criteria.
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WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.34	Barren Land	0.52	Grassland/Herbaceous	0.45
Developed-Open Space	3.87	Deciduous Forest	11.3	Pasture Hay	1.84
Developed-Low Intensity	3.36	Evergreen Forest	25.39	Cultivated Crops	0.18
Developed-Medium Intensity	0.2	Mixed Forest	35.78	Woody Wetlands	4.18
Developed-High Intensity	0.01	Shrub-Scrub	2.01	Emergent Wetlands	0.31



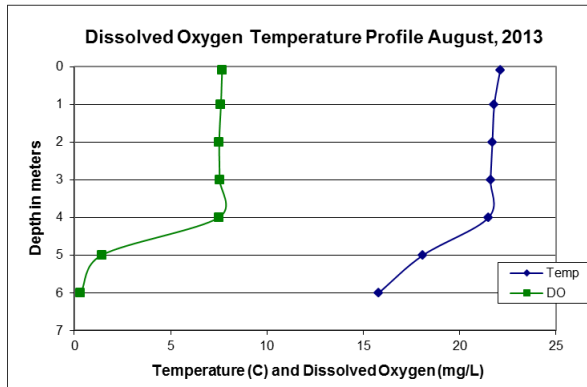
VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

OTTER POND, SUNAPEE, NH

2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- CHLOROPHYLL-A:** Chlorophyll levels were relatively low throughout the summer and below the state median. Historical trend analysis indicates relatively stable chlorophyll with low variability between years.
- CONDUCTIVITY/CHLORIDE:** Tributary conductivity was elevated throughout the summer, particularly in Star Lake 2 in July and August under low flow conditions. Associated tributary chloride levels were also elevated, particularly for Star Lake 2 in August, indicating road salting practices influence conductivity levels. Deep spot conductivity and chloride were also elevated and historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity since monitoring began.
- E. COLI:** Beach E. coli levels were well below the state standard for public beaches.
- TOTAL PHOSPHORUS:** Phosphorus levels in Star Lake Inlet and Star Lake 2 were elevated in July and August during low flow conditions and turbidity levels were also slightly elevated which may have contributed to the higher phosphorus levels. Deep spot phosphorus levels were relatively low throughout the summer and less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus with low variability between years.
- TRANSPARENCY:** Transparency was deepest in May corresponding with low levels of algal growth. Viewscope transparency was consistently greater and approximately equal to the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- TURBIDITY:** Baptist Brook turbidity was slightly elevated in June and September. Significant rainfall occurred prior to sampling in June. Star Lake 2 turbidity was elevated in May, July, August and September when tributary flow conditions were low or there was no flow which can concentrate organic matter.
- pH:** pH levels are less than desirable range 6.5 – 8.0 units in the deep spot and several tributaries. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH.
- RECOMMENDED ACTIONS:** The increasing epilimnetic conductivity trend is concerning. Work with local and state road agents to identify ways to reduce the impact of road salting. Encourage local road agents to obtain a Voluntary NH Salt Applicator license through the UNH Technology Transfer Center's Green SnowPro Certification Program. The decreasing epilimnetic pH is likely due to the impacts of acid rain; a result of emissions from coal burning power plants. However many plants have significantly reduced their emissions and hopefully the pond pH will recover. Keep up the great work!



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: < 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m³

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

Table 1. 2013 Average Water Quality Data for OTTER POND

Station Name	Alk.	Chlor-a	Chloride	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	#/100ml	ug/l	m		ntu	
Baptist Brook			43	187.1		10	NVS	VS	1.55	6.46
Beach					3					
Epilimnion	7.00	3.65	23	119.3		10	2.87	3.28	1.15	6.44
Hypolimnion				123.7		10			1.26	6.29
Little Sunapee Brook			28	105.2		9			0.71	6.52
Outlet			25	121.5		8			1.04	6.59
Star Lake 2			250	309.2		24			6.43	6.15
Star Lk Inlet			18	102.8		19			2.06	6.05

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
Conductivity	Degrading	Data significantly increasing.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.

